Marketing mix modelling case study

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1.0 Introduction

Understanding the ROI across all of your paid marketing channels is a top priority for senior-level executives across every industry and every geographical market. Getting a clear sense of the ROI on each channel allows companies to answer really important questions about performance changes increasing a specific marketing channel budget, marketing channel saturation or budget optimization across different marketing channel.

1.1 Scope of work & Business task

This case study, aim to showcase how to use marketing campaign data to create a marketing mix modeling solution. This work provide also a budget prediction to reach a predetermined business goal.

2.0 Data

The data set used includes information about several different marketing campaign performed using the email channel.

Table 1: Marketing campaign data sample

Campaign	Channel	Return	Spend
HBD Promo	Email	42746	13415
BOGO Sale	Email	161853	49659
Set for Spring	Email	5071	1993
Last chance promo	Email	25046	6732
Semi-annual sale	Email	99865	27014

The data set was aggregated to the campaign level, meaning each row represents one unique campaign. The Return value need to some measure of value to your business and in this case was revenue generated. Return value can vary depending on:

- **What is valuable for your business**: Are you in the retail industry where customers are making purchases directly on your site? If so, you may want to use Revenue or Orders for your measure of value. Are you a media site where consumption of content is the most important metric? If so, you may want to use blog views or subscriptions as your measure of value. Return must always be specific to your industry and your business organization.
- **What type of attribution model the business use**: The amount of Return allocated to each campaign will be directly affected by the attribution method that you deploy. Most companies are using simple, rules-based attribution methods like first touch or last touch.

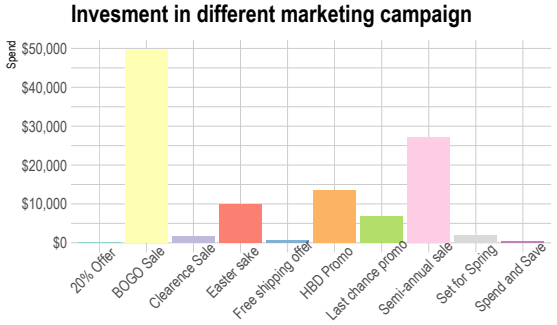
The Spend value is clearly straight forward, it provide information about the budget spent on the campaign.

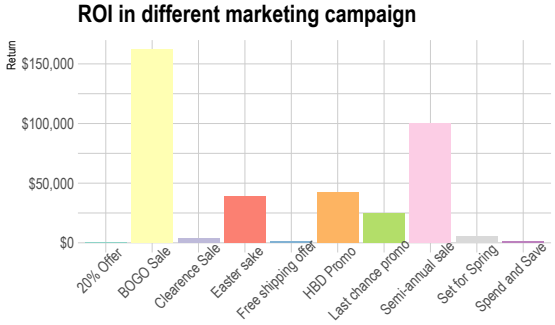
3.0 Result

Assuming a business goal of $600.000 in revenue from those email marketing campaign, our model suggested a total budget incremented of around 53% for an amount of $171.455

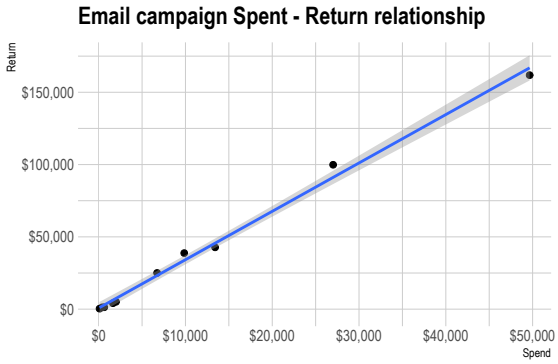
4.0 Analysis

Since data was already aggregated at high level, we can jump directly to visualize the campaigns performance.





Buy one get one was the most expensive campaign and it had a return of 3x on the investment. The semi-annual sale was the most effective campaign with a return of around 4x on the investment. If we confront the Spend and Return value across all the email campaign, the relationship between them, at a first glance, might be interpreted as linear model.



Using a linear model in this case raise up 2 problems:

- A linear model assumes that you have infinite growth.
- There are real-world phenomena like market saturation and email fatigue that suggest infinite growth is not actually possible.

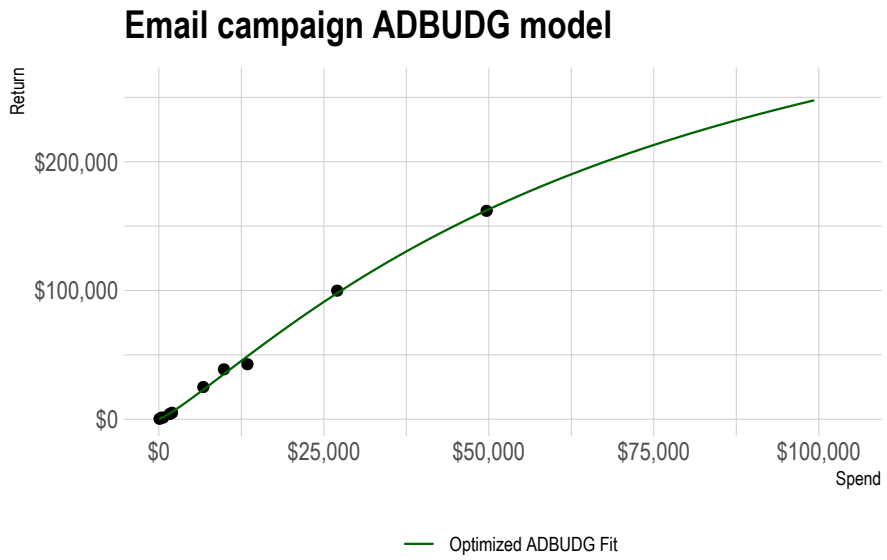
To correctly model the email campaign data, a model that exhibits diminishing marginal returns is needed. The **ADBUDG model** is a very flexible model that incorporates diminishing marginal returns. The ADBUDG model is defined as follows:

$$Return = B + (A - B)\frac{\text{Spend}^{\text{C}}}{\text{D} + \text{Spend}^{\text{C}}}$$

Where:

- A – The maximum amount of return possible for a campaign given a long term investment.
- B – The minimum amount of return possible for a campaign given a long term investment.
- C – Controls the shape of the curve.
- D – Represents initial market share or market saturation effects.

Using this model the result is:



As we can see the green line which represents the ADBUDG model perfectly fit our value and exhibits the diminishing marginal returns effect. Now that we have a good model we can estimate how much the spent budget should be increased in each campaigns to reach that business goal.

Assuming the business want to reach a goal of $600.000 in return, the estimated budget for each campaign are as fallow: